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ABSTRACT

Two-column objectives are listed for an integrated science curriculum (grades K-12), often subheaded according to science area (biology, physical science), and grade level. Choices of environmental topics such as weather, conservation of natural resources, and the interdependence of organisms and environment dominate objectives written for grades K-6. Food webs, ecological community structure, and interactions between organisms are written for grade 7 objectives. Also listed for grade 7 are several objectives for first aid and the study of algae and protozoans. One space science objective is written for grade 8. Grade 9 includes varied biological topics, including microbiology, locomotion, behavior, germination of seeds, and forest conservation. Biology (grades 10-12), physical science (grades 10-11), and advanced biology (grade 12) include ecological topics such as population growth, ecological systems, pollutants (natural and man-made), ecological communities, and succession. Interspersed in grades 10-12 are objectives written for the study of classification (grade 10), and higher plants, reproduction and development in animals, and structure and function in animal systems (grade 12). (CS)

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SCIENCE

K - 12

INTERDEPENDENCY OF LIVING THINGS AND
LIVING THINGS WITH THEIR ENVIRONMENT

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PROJECT SEARCH

ARTICULATED CURRICULUM

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August 1975

MRS. ROSE DANELLA and NORMAN I. SIEGEL, both former Board Members deserve special mention for all their efforts on behalf of Project SEARCH.

UTICA CITY SCHOOL DISTRICT
13 Elizabeth Street
Utica, New York 13501

SCIENCE

The student will know:

- that air is all around.

- that people feel air but cannot see it.

- that people can see what moving air does when the wind blows.

- that air can warm or cool.

- that water is necessary to all living things.

- the many uses of water.
- that seasons change.

- changes in weather affect living things.

- that caring for the environment is important and all should participate.

- that air takes up space.

- that the lack of or abundance of water can cause problems.
- that there are different kinds of bodies of water.
- that weather is measured by a variety of instruments.
- that weather changes according to seasons.

INTERDEPENDENCY OF LIVING THINGS AND LIVING THINGS THE ENVIRONMENT

The student will: Grade

- describe the action of inflating and deflating balloon.

- describe the feeling of wind on the face and body standing in the wind.
- describe appearance of clothes blowing on windy
- discuss movement of kites flying on windy days.
- describe and report on harm and damage of a wind
- describe differences in temperature after moving a warm room to a cool place.
- describe what happens to living things deprived water.
- name and illustrate ways in which water is used
- name the seasons and describe them briefly.
- describe and compare clothing used in each season comfort, fun, and work.
- explain how changes in weather affects plants, w life, and man.
- explain what hibernation means and name some ani that hibernate.
- name some ways littering destroys.
- list some proper ecology practices.

Grade

- explain what happens when a balloon is inflated.
- compare and contrast the overwatering or underwat of classroom plants.
- name three bodies of water and describe them.
- identify some weather instruments from pictures.
- illustrate typical seasonal weather.

INTERDEPENDENCY OF LIVING THINGS AND LIVING THINGS WITH THE ENVIRONMENT

The student will:

Grade K

- describe the action of inflating and deflating a balloon.
- describe the feeling of wind on the face and body when standing in the wind.
- describe appearance of clothes blowing on windy days.
- discuss movement of kites flying on windy days.
- describe and report on harm and damage of a wind storm
- describe differences in temperature after moving from a warm room to a cool place.
- describe what happens to living things deprived of water.
- name and illustrate ways in which water is used by man
- name the seasons and describe them briefly.
- describe and compare clothing used in each season for comfort, fun, and work.
- explain how changes in weather affects plants, wild life, and man.
- explain what hibernation means and name some animals that hibernate.
- name some ways littering destroys.
- list some proper ecology practices.

Grade I

- explain what happens when a balloon is inflated.
- compare and contrast the overwatering or underwatering of classroom plants.
- name three bodies of water and describe them.
- identify some weather instruments from pictures.
- illustrate typical seasonal weather.

- that wi[illegible] can be helpful or harmful - that ma[illegible] affect the earth and livi[illegible] things around [illegible] in helpful or harmful ways.	- illustrate helpful and harmful effects of wind. - list ways man destroys the environment and ways h can help preserve the earth and its inhabitants.
	Grade 2
- that plants and animals need air to live.	- draw pictures of two plants after observing exper ment in which one plant has been placed in an air tight jar and the other in open air (all other c ditions constant). Explain pictures.
- that air is all around us in motion.	- list 5 ways in which we know that air is all arou e.g. fire burns, respiration, and wind.
- that there is vapor in water.	- explain evaporation.
- that water can be a liquid, solid, or gas.	- compare water as it appears in each state, liquid solid, gas.
- that water evaporates into water vapor or gas and returns as rain, snow, or ice.	- draw a diagram illustrating the water cycle. Exp
- that weather affects men's work and recreation.	- list and explain the relationship between seasona jobs, seasonal clothes, seasonal recreation, and weather.
- that a thermometer is the instrument used to measure temperature.	- demonstrate a knowledge of how to read the thermo
- that there is a reciprocal relationship between man and his environment. Individual actions should bring people and the environment toward a more harmonious relationship.	- explain and depict the harmful effects of water pollution to plants, wildlife, and man.
	Grade 3
- that air is a real substance that occupies space.	- explain the results of several experiments and de strations designed to show that air occupies space
- the importance of water to living things.	- list 5 ways man depends upon water for his persona use. - depict two ways man uses water in his technology (farming, power). - illustrate four ways that man uses water in his recreation. - depict ways in which plants use water. - illustrate or report on the relationship between water and wildlife.

Page 2

ful or harmful	- illustrate helpful and harmful effects of wind.
he earth and living things or harmful ways.	- list ways man destroys the environment and ways he can help preserve the earth and its inhabitants.
	Grade 2
ls need air to live.	- draw pictures of two plants after observing experiment in which one plant has been placed in an air tight jar and the other in open air (all other conditions constant). Explain pictures.
us in motion.	- list 5 ways in which we know that air is all around us e.g. fire burns, respiration, and wind.
water.	- explain evaporation.
liquid, solid, or gas.	- compare water as it appears in each state, liquid, solid, gas.
into water vapor or gas now, or ice.	- draw a diagram illustrating the water cycle. Explain.
men's work and recreation.	- list and explain the relationship between seasonal jobs, seasonal clothes, seasonal recreation, and the weather.
the instrument used to	- demonstrate a knowledge of how to read the thermometer
ocal relationship between t. Individual actions l the environment toward tionship.	- explain and depict the harmful effects of water pollution to plants, wildlife, and man.
	Grade 3
stance occupies space.	- explain the results of several experiments and demonstrations designed to show that air occupies space.
to living things.	- list 5 ways man depends upon water for his personal use. - depict two ways man uses water in his technology (farming, power). - illustrate four ways that man uses water in his recreation. - depict ways in which plants use water. - illustrate or report on the relationship between water and wildlife.

- the water cycle process.	- chart the three phases of the water cycle.
- that weather affects our daily activities.	- compare and contrast ways in which weather affe health factors, sports activities, and occupati
- the kind of weather varies according to the type of air mass over an area.	- identify air masses on a weather map and after a collection of weather maps for successive day describe how air masses move across the country
- that man is an integral part of his environment.	- list 5 ways man can control his environment.
	Gra
- the air surrounding the earth is called the atmosphere.	- define the term atmosphere.
	- explain how the atmosphere acts as an insulator
- that there are three layers of the atmosphere.	- list the three main layers of the atmosphere.
- that the conditions of the atmosphere are measured by various weather instruments.	- describe and interpert uses of common meteorlogi instruments.
- that water evaporates into invisible vapor, and condenses when cooled.	- define evaporation and condensation.
- that the process of continuing evaporation and condensation is called the water cycle.	- illustrate in chart form the water cycle.
- that precipitation results when water vapor condenses and falls to the ground	- make illustrations to show various forms of prec and how they are formed.
- that rain, snow, sleet, and hail are forms of precipitation that soak into the ground and run off into streams, lakes, and rivers.	- compare and contract (in graphs and charts) the maps of Washington State with a fairly arid area as New Mexico, and note the different in lakes, and streams.
- that erosion and floods cause great damage.	- describe examples of erosion and floods.
- that man must find ways to conserve natural resources.	- illustrate with a chart, animals that are on the endangered species list and report on why they a
	- write a report on one way man can conserve a nat resource.
	- describe organic gardening and how it improves t environment.
- that there is an interdependence of living things and the environment.	- report on how population and industrialization h ecology-include possible preventive measures.
	G
- that air has weight, occupies space and exerts pressure.	- explain why an inflated basketball weighs more t deflated basketball (or any other object that th inflated.)
- that water has three states.	- define the three states of water, explaining wha when water is boiled and frozen.

	- chart the three phases of the water cycle.
daily activities.	- compare and contrast ways in which weather affects dress, health factors, sports activities, and occupations.
es according to the area.	- identify air masses on a weather map and after studying a collection of weather maps for successive days, will describe how air masses move across the country.
part of his environment.	- list 5 ways man can control his environment.
	Grade 4
earth is called the	- define the term atmosphere.
	- explain how the atmosphere acts as an insulator.
ers of the atmosphere.	- list the three main layers of the atmosphere.
he atmosphere are her instruments.	- describe and interpert uses of common meteorlogical instruments.
to invisible vapor, and	- define evaporation and condensation.
inuing evaporation and he water cycle.	- illustrate in chart form the water cycle.
ts when water vapor he ground	- make illustrations to show various forms of precipitation and how they are formed.
and hail are forms of into the ground and run and rivers.	- compare and contract (in graphs and charts) the rainfall maps of Washington State with a fairly arid area such as New Mexico, and note the different in lakes, rivers, and streams.
cause great damage.	- describe examples of erosion and floods.
to conserve natural	- illustrate with a chart, animals that are on the endangered species list and report on why they are there.
	- write a report on one way man can conserve a natural resource.
	- describe organic gardening and how it improves the environment.
pendence of living t.	- report on how population and industrialization has upset ecology-include possible preventive measures.
	Grade 5
pies space and exerts	- explain why an inflated basketball weighs more than a deflated basketball (or any other object that then can be inflated.)
es.	- define the three states of water, explaining what happens when water is boiled and frozen.

- that the process of continuous evaporation and condensation is called the water cycle.	- draw a diagram depicting the water cycle.
- that weather is the condition of the atmosphere.	- describe the weather as it relates to high and low pressure fronts.
- that air, water, and noise pollution have harmful effects upon man.	- report on various causes and results of air, water noise pollution.
	Gr
- that weather is influenced by many factors.	- define the conditions which influence weather (air pressure, temperature, currents, etc.)
- the differences between weather and climate.	- define weather as the condition of air at a particular time and place. - define climate as the sustained condition of the weather of a general area.
- that meteorology is the science of weather.	- define meteorology and explain the work of meteorologists.
- that man is part of his environment.	- discuss and illustrate the importance of preserving environment.
- that man can change his environment.	- list several ways that men can change their environment (electricity, industrialization, urbanization, transportation, space technology, dams, atomic energy) for each method names, write three ways men have used to change their environment.
- that wind and water erosion affect the surface of land.	- explain how wind and water erosion affect the surface of the land. - discuss ways of preventing wind and water erosion.
	G
- the definition of a food chain.	- list the three types of food chains. Diagram the three types of food chains.
- the definition of a food web.	- diagram a food web. By acting together as a class demonstrate a food web.
- how a population functions.	- list the ingredients in a population.
- how a community functions.	- list the differences between a population and a community.
- the possible types of interactions within an environment neutralism, commensalism, amenalism, protocooperation, mutualism, parasitism predation.	- complete a collage showing the possible interactions. By acting together as a class, demonstrate various interactions.

ous evaporation and er cycle.	- draw a diagram depicting the water cycle.
n of the atmosphere.	- describe the weather as it relates to high and low pressure fronts.
ollution have harmful	- report on various causes and results of air, water, and noise pollution.
	Grade 6
y many factors.	- define the conditions which influence weather (air pressure, temperature, currents, etc.)
her and climate.	- define weather as the condition of air at a particular time and place. - define climate as the sustained condition of the weather of a general area.
nce of weather.	- define meteorology and explain the work of meteorologists.
ronment.	- discuss and illustrate the importance of preserving the environment.
ronment.	- list several ways that men can change their environment, (electricity, industrialization, urbanization, transportation, space technology, dams, atomic energy). For each method names, write three ways men have used it to change their environment.
affect the surface	- explain how wind and water erosion affect the surface of the land. - discuss ways of preventing wind and water erosion.
	Grade 7
n.	- list the three types of food chains. Diagram the three types of food chains. - diagram a food web. By acting together as a class, demonstrate a food web. - list the ingredients in a population. - list the differences between a population and a community.
tions within an nsalism, utualism, para-	- complete a collage showing the possible interactions. By acting together as a class, demonstrate various interactions.

- the interpedendency of plants with their environment.	- name or list the various minerals provided by the which plants utilize. List the various gases uti plants. List the various gases dispensed by the to the air. List the ways in which plants help p erosion. Write the balanced equation for photosy Define transiration and show how it affect the en
- how to treat shock (non-electrical).	- list or perform in a simulation the following: treat all serious injury cases for shock by the steps: put the person in a horizontal position back unless bleeding from mouth in which case t is put on his side. Persons without breathing will have feet elevated. Persons with breathin will have chest elevated. Make sure the injure is comfortable. Call or send for help.
- how to treat various types of bleeding.	- list or ferform in a simulation the following: apply direct pressure using clean cloth if poss direct pressure doesn't stop bleeding squeeze a point between would and heart. Keep fingers fl squeezing. Don't let person move. Elevate wou there is a broken bone. In serious cases treat shock. Send or call for help.
- how to treat cases when there is a breathing failure.	- list or perform the following: clean the mouth, tip the head and pinch the nos Blow every 5 seconds for an adult, then listen, until doctor tells you to stop or person starts If no doctor is around treat for shock then cal help once person is breathing. If mouth is cut small, close mouth and breath into nose. In ca babies, cover both nose and mouth with your mou gently every 3 second.
- how to treat cases of poisoning.	- list or perform the following: give ½ glass of water or milk. Decide if you s make or not make him vomit - make him vomit all unless they smell strong or cause burns. Call or poison control center. Treat for shock.

s with their

- name or list the various minerals provided by the soil which plants utilize. List the various gases utilized by plants. List the various gases dispensed by the plants to the air. List the ways in which plants help prevent erosion. Write the balanced equation for photosynthesis. Define transiration and show how it affect the environment.

trical).

- list or perform in a simulation the following:
  treat all serious injury cases for shock by the following steps: put the person in a horizontal position on his back unless bleeding from mouth in which case the person is put on his side. Persons without breathing trouble will have feet elevated. Persons with breathing trouble will have chest elevated. Make sure the injured person is comfortable. Call or send for help.

f bleeding.

- list or ferform in a simulation the following:
  apply direct pressure using clean cloth if possible. If direct pressure doesn't stop bleeding squeeze at pressure point between would and heart. Keep fingers flat when squeezing. Don't let person move. Elevate would unless there is a broken bone. In serious cases treat for shock. Send or call for help.

e is a breathing

- list or perform the following:
  clean the mouth, tip the head and pinch the nose. Blow every 5 seconds for an adult, then listen, Keep up until doctor tells you to stop or person starts breathing. If no doctor is around treat for shock then call for help once person is breathing. If mouth is cut or too small, close mouth and breath into nose. In case of babies, cover both nose and mouth with your mouth, breathe gently every 3 second.

ing.

- list or perform the following:
  give ½ glass of water or milk. Decide if you should make or not make him vomit - make him vomit all poisons unless they smell strong or cause burns. Call doctor or poison control center. Treat for shock.

- how to treat broken bones.	- list or perform the following: have the person remain still. Apply correct break. Call for help. Treat for shock.
- how to treat various burns.	- list or perform the following: small burns - put in cold water, cover with c bandages. large bad burns - do not move clothing. Cove dry cloth or plastic bags, call doctor and tr shock. Do not put ointments on burn. chemical burn - flush with water for ten minu doctor and treat for shock.
- how to perform different rescues.	- list or perform the following: in a rescue never put your own life in danger gas leaks - shut off supply, leave home and c company. in burning buildings - check doors, do not op Put cold wet cloth over nose and mouth. If y leave open window slightly and breathe air co hang sheet out to attract attention.
- how to treat head injuries.	- list or perform the following: get person to lie down. Check breathing. Ca Do not give anything to eat or drink.
- how to treat internal bleeding.	- list or perform the following: get him to lie down. Check breathing often. give anything to eat or drink. Call doctor.
- how to treat heart attack and epilepsy.	- list or perform the following: in case of epilepsy - move things away from p try to restrain and don't talk about it after for heart attack - get him to lie down. Make breathing easily. Bring his special medicine doctor.
- how to treat poisonous snake bite.	- list or perform the following: lie down. Tie a rubber band or cloth band 2 above the bite, between the bite and heart.

s.

- list or perform the following:
  have the person remain still. Apply correct splint for break. Call for help. Treat for shock.

ns.

- list or perform the following:
  small burns - put in cold water, cover with clean dry bandages.
  large bad burns - do not move clothing. Cover with thick dry cloth or plastic bags, call doctor and treat for shock. Do not put ointments on burn.
  chemical burn - flush with water for ten minutes, call doctor and treat for shock.

rescues.

- list or perform the following:
  in a rescue never put your own life in danger.
  gas leaks - shut off supply, leave home and call gas company.
  in burning buildings - check doors, do not open hot ones. Put cold wet cloth over nose and mouth. If you can't leave open window slightly and breathe air coming in, hang sheet out to attract attention.

s.

- list or perform the following:
  get person to lie down. Check breathing. Call doctor. Do not give anything to eat or drink.

eding.

- list or perform the following:
  get him to lie down. Check breathing often. Do not give anything to eat or drink. Call doctor.

and epilepsy.

- list or perform the following:
  in case of epilepsy - move things away from person, don't try to restrain and don't talk about it afterwards.
  for heart attack - get him to lie down. Make sure he is breathing easily. Bring his special medicine. Call doctor.

ke bite.

- list or perform the following:
  lie down. Tie a rubber band or cloth band 2 inches above the bite, between the bite and heart.

tight enough to stop the blood near the surface of skin, but not tight enough to stop all blood. Get care of a doctor right away.

- how to treat animal bites.

- list or perform the following:
  if any animal bites you, wash the bite with soap a water. Stop bleeding and bandage the bite. Call doctor right away, call the police and a veterinar remember what the animal looks like so you can tel doctor or police.

- how to treat insect bites.

- list or perform the following:
  describe dangerous insects and identify pictures o
  mild insect bites - treat by using calamine lotion cold wet cloth. Do not squeeze.
  dangerous insect bites - if the bits is on arm or tie a rubber band or a cloth band above the bite, between the bite and heart, to stop the poison fro to the heart. Don't try to stop all flow of blood only the blood near the skin.
  put ice water or ice on a cloth on the bite. Take band off after 5 minutes. Keep the arm or leg hanging down. Take the person to a doctor. Be su he keeps breathing.

- how to treat people sick from too much sun and has - hot dry skin and cool, wet skin.

- list or perform the following:
  too much sun and hot, dry skin - sponge him with w and take him to doctor or hospital.
  too much sun and cool, wet skin - have him rest an give him salt water to drink.

- how to treat frostbite.

- list or perform the following:
  warm a frostbitten part gently and quickly.
  do <u>not</u> rub frostbite. Bandage with clean dry clot
  do <u>not</u> break blisters. Call for doctor.

- how to treat electric shock.

- list or perform the following:
  stop flow of electricity. Check breathing. Treat for shock. Call doctor.

tight enough to stop the blood near the surface of the skin, but not tight enough to stop all blood. Get the care of a doctor right away.

- list or perform the following:
  if any animal bites you, wash the bite with soap and water. Stop bleeding and bandage the bite. Call the doctor right away, call the police and a veterinarian, remember what the animal looks like so you can tell the doctor or police.

- list or perform the following:
  describe dangerous insects and identify pictures of same.
  mild insect bites - treat by using calamine lotion or cold wet cloth. Do not squeeze.
  dangerous insect bites - if the bits is on arm or leg, tie a rubber band or a cloth band above the bite, between the bite and heart, to stop the poison from going to the heart. Don't try to stop all flow of blood. Stop only the blood near the skin.
  put ice water or ice on a cloth on the bite. Take the band off after 5 minutes. Keep the arm or leg hanging down. Take the person to a doctor. Be sure he keeps breathing.

too much sun and wet skin.

- list or perform the following:
  too much sun and hot, dry skin - sponge him with water and take him to doctor or hospital.
  too much sun and cool, wet skin - have him rest and give him salt water to drink.

- list or perform the following:
  warm a frostbitten part gently and quickly.
  do <u>not</u> rub frostbite. Bandage with clean dry cloth.
  do <u>not</u> break blisters. Call for doctor.

- list or perform the following:
  stop flow of electricity. Check breathing. Treat for shock. Call doctor.

- that single celled protozoa have a special structure.	- read and draw, labeling the special structures celled protozoa. (nucleus, cytoplasm and cell
- that single cells of algae are made up of special structures.	- read and draw a single celled algae and label it structures (nucleaus, cell membrane, cytoplasm cell wall).
-that single cells of algae or protozoa are made up of elements.	- read and list the elements which make up cells and protozoa.
- the different types of algae found in water.	- collect samples of water - pond, stream, rain ba Observe samples under microscope. Draw the diff types of algae. Name the different types of alg possible such as Pondscum, Stonewart, Water Net, Nostoc, Oscillatoria, Desmids and Diatoms.
- that algae are the producers found in water.	- read from assigned text. Observe films or film charts, and photographs. Observe that they are in color.
- that algae are green.	- observe slides, pictures, colored film and films Read, and write the name of the various types of Draw pictures and color them properly. Write th carry on the process of photosynthesis. Read an that sunlight is responsible for photosynthesis.
- how algae reproduces.	- read and write up or fission or cell division. aquarium water under a microscope to notice if f is taking place.
- how plant cells reproduce.	- read assigned work. Draw diagrams from book. R slides, films, filmstrips or charts.
- that algae cells divide by a method known as a sexual reproduction or cell division.	- read and draw charts from text showing cell divi sexual reproduction. Know that a sexual reprodu doesn't need two organisms.
- that algae lives in most kinds of water.	- collect water from a pond, river, lake, aquarium barrel and wash water. Observe each under a mic or any form of algae.

have a special	- read and draw, labeling the special structures of a single celled protozoa. (nucleus, cytoplasm and cell wall).
are made up of	- read and draw a single celled algae and label its structures (nucleaus, cell membrane, cytoplasm and cell wall).
or protozoa are	- read and list the elements which make up cells of algae and protozoa.
e found in water.	- collect samples of water - pond, stream, rain barrel, lake. Observe samples under microscope. Draw the different types of algae. Name the different types of algae if possible such as Pondscum, Stonewart, Water Net, Ulothrix, Nostoc, Oscillatoria, Desmids and Diatoms.
s found in water.	- read from assigned text. Observe films or film strips, charts, and photographs. Observe that they are green in color.
	- observe slides, pictures, colored film and filmstrips. Read, and write the name of the various types of algae. Draw pictures and color them properly. Write that algae carry on the process of photosynthesis. Read and write that sunlight is responsible for photosynthesis.
	- read and write up or fission or cell division. Observe aquarium water under a microscope to notice if fission is taking place.
	- read assigned work. Draw diagrams from book. Review slides, films, filmstrips or charts.
a method known as a division.	- read and draw charts from text showing cell division or a sexual reproduction. Know that a sexual reproduction doesn't need two organisms.
nds of water.	- collect water from a pond, river, lake, aquarium, rain barrel and wash water. Observe each under a microscope for any form of algae.

	list whatever form of algae it will find. Draw the different forms
- how to operate a microscope.	- write and study the parts of the microscope. Identi parts orally. Demonstrate its operation. Describe purpose of each part. Label its parts on a drawing
- about microscope slides and coverslips.	- describe material: slides, coverslips.
- the three methods of preparing slides.	- read textbook assignment. Describe what a "wet mou Describe what a "tissue" is. Describe what a "smea is. Demonstrate preparing a slide.
- algae lives out of water.	- collect algae from rocks, fence posts, and tree bar Indicate what it sees under a microscope. Draw wha it sees
- the physical conditions under which algae live.	- read from assigned text or other source. List the physical conditions such as: temperature (has to b enough), water (the kind they can live in), oxygen (needed for oxidation), sunlight (to carry on photo Observe by viewing filmstrips, filmloops, or films.
- what decomposers are and do (bacteria that cause decay of dead plants and animal matter).	- read assigned work. Observe by viewing film, films and filmloops.
- that bacteria or decomposers live anywhere.	- distinguish by reading that decomposers can live as submerged dwellers, surface dwellers or as free swi
- that algae do not have tubes or other structures to carry water.	- read, draw and write up the structure possessed by
- producers such as algae use the sun's energy to build foods.	- read, name and draw the process of photosynthesis c out by singled cell bacteria namely algae.
- that producers such as algae become food for other forms of life.	- read and name the various algae which become food f other organisms.
- that interdependency exist between algae and other organisms.	- read about the materials needed by the algae which required for food making.

	list whatever form of algae it will find. Draw the different forms
	- write and study the parts of the microscope. Identify its parts orally. Demonstrate its operation. Describe the purpose of each part. Label its parts on a drawing.
verslips.	- describe material: slides, coverslips.
slides.	- read textbook assignment. Describe what a "wet mount" is. Describe what a "tissue" is. Describe what a "smear" is. Demonstrate preparing a slide.
	- collect algae from rocks, fence posts, and tree bark. Indicate what it sees under a microscope. Draw what it sees
which algae live.	- read from assigned text or other source. List the physical conditions such as: temperature (has to be warm enough), water (the kind they can live in), oxygen (needed for oxidation), sunlight (to carry on photosynthesis Observe by viewing filmstrips, filmloops, or films.
cteria that animal matter).	- read assigned work. Observe by viewing film, filmstrips, and filmloops.
ve anywhere.	- distinguish by reading that decomposers can live as submerged dwellers, surface dwellers or as free swimmers.
other structures	- read, draw and write up the structure possessed by algae.
sun's	- read, name and draw the process of photosynthesis carried out by singled cell bacteria namely algae.
come food for	- read and name the various algae which become food for other organisms.
een algae and	- read about the materials needed by the algae which are required for food making.

- algae are the first link in the food chain.	- read about and draw a food chain.
- that another kingdom called Protista has been formed by biologists.	- read, define and identify the one celled organisms make up the kingdome of Protista.
- that the kingdom of Protista is also made up of protozoa.	- read and name various kinds of protozoans.
- that protozoans are one celled animals.	- read about protozoans. Draw various protozoans. L names of protozoans such as: Paramecium , amoeba, Volvox, Phacus, Actinophrys, Difflugia, Vorticella, Spirostomum, Plasmodium,
- that protozoans are the second link in the food chain.	- read and describe the importance of protozoans as "consumers"
- that protozoans feed on algae.	- describe the movements of protozoans by observing t under a microscope.
- that protozoans depend upon the physical conditions of their environment.	- read and list the physical conditions necessary for protozoans to live. Warmth (proper temperature), o water
- that protozoans move about. (locomotion).	- read, view filmstrips, films, filmloops, list and o their movements (under a microscope.
- protozoa and algae are interdependent.	- read and draw to show how protozoa depend on algae food which makes them interdependent wuch as: movement, gathering of food, ability to carry out l processes.
- that protozoans do carry out their life activities or processes.	- observe, list and define life activities or process Process: Activity Injestion: Taking of food into the body. Digestion: Changing of food into soluble form. Respiration: Ust of oxygen in the body. Excretion: Removing of waste from the body. Reproduction: Reproduction of new organisms. Asorption: Passing of essential materials into the
- the process of ingestion.	- view and observe AV materials and read how food is located and taken internally.
- the process of digestion.	- view and observe AV material and read as to how foo changed into soluable form to be used by a protozoa.
- that protozoa carries on respiration.	- read and view AV material to find out the use of oxy in the body of a protozoa.
- that protozoa carry out the process of excretion.	- read and view AV material to observe protozoa carryi out their process of excretion.
- that protozoa reproduce themselves.	- read and view AV materials to observe the process of duction; fission or cell division - asexual.

in the food chain.	- read about and draw a food chain.
ed Protista has .	- read, define and identify the one celled organisms which make up the kingdome of Protista.
sta is also made up	- read and name various kinds of protozoans.
elled animals.	- read about protozoans. Draw various protozoans. List names of protozoans such as: Paramecium , amoeba, Volvox, Phacus, Actinophrys, Difflugia, Vorticella, Spirostomum, Plasmodium, Peparina.
econd link in the lgae.	- read and describe the importance of protozoans as "consumers"
	- describe the movements of protozoans by observing them under a microscope.
on the physical onment.	- read and list the physical conditions necessary for protozoans to live. Warmth (proper temperature), oxygen, water
t. (locomotion).	- read, view filmstrips, films, filmloops, list and observe their movements (under a microscope.
terdependent.	- read and draw to show how protozoa depend on algae for food which makes them interdependent wuch as: movement, gathering of food, ability to carry out life processes.
out their life	- observe, list and define life activities or processes. Process: Activity Injestion: Taking of food into the body. Digestion: Changing of food into soluble form. Respiration: Ust of oxygen in the body. Excretion: Removing of waste from the body. Reproduction: Reproduction of new organisms. Asorption: Passing of essential materials into the cell.
	- view and observe AV materials and read how food is located and taken internally.
	- view and observe AV material and read as to how food is changed into soluable form to be used by a protozoa.
respiration.	- read and view AV material to find out the use of oxygen in the body of a protozoa.
he process of	- read and view AV material to observe protozoa carrying out their process of excretion.
hemselves.	- read and view AV materials to observe the process of reproduction; fission or cell division - asexual.

- protozoa carry out the process of absorption.	- read and view AV material to see how absorption
- that protozoa serve as food for higher organisms-	- read and view AV material to see protozoa being as food. Observe the important fact that proto in the food chain.
- that protozoa are an important part of the food chain.	- read, view and draw several food chains.
- that protozoan's waste products are important.	- read about the excretion process and identify t products as CO_2 and H_2O which are waste product by algae to make food.
- that protozoan's are necessary for inter-dependency living in a community of microscopic life.	- indicate that: algae capture sunlight to make with carbon dioxide and water. Protozoa use al In the process of digestion CO_2 and H_2O are giv These waste products become raw materials for a help make food.
- that Protozoan's are a source of food for multicellular animals.	- read or view AV material showing food chains wi organisms involved.
- that the kingdom of Protista is important.	- read or view AV material showing what algae is function or importance in a community; showing protozoa is and its function or importance in a showing how algae and protozoa are interdepende how their interdependency is important for the organisms in the community.
- that algae and protozoa are important to man.	- distinguish the fact that without algae (in reg what we know today) that other forms of life, i man are interdependent upon each other in orde
- the biological problems involved in keeping a man in space.	- write a list of all the elements in man's earth environment that he must take with him on a sp Recite the ways in which man in space must get human wastes. Name the ways in which man in s copes with the problems of weightlessness when or grooms himself.

ocess of absorption.	- read and view AV material to see how absorption takes place.
od for higher organisms-	- read and view AV material to see protozoa being used as food. Observe the important fact that protozoa play in the food chain.
rtant part of the	- read, view and draw several food chains.
ducts are important.	- read about the excretion process and identify the waste products as CO_2 and H_2O which are waste products needed by algae to make food.
sary for inter- munity of	- indicate that: algae capture sunlight to make food along with carbon dioxide and water. Protozoa use algae as food. In the process of digestion CO_2 and H_2O are given off. These waste products become raw materials for algae to help make food.
rce of food for	- read or view AV material showing food chains with organisms involved.
ta is important.	- read or view AV material showing what algae is and its function or importance in a community; showing what protozoa is and its function or importance in a community; showing how algae and protozoa are interdependent; showing how their interdependency is important for the other organisms in the community.
e important to man.	- distinguish the fact that without algae (in regard to what we know today) that other forms of life, including man are interdependent upon each other in order to live.

Grade 8

volved in	- write a list of all the elements in man's earth environment that he must take with him on a space flight. Recite the ways in which man in space must get rid of all human wastes. Name the ways in which man in space copes with the problems of weightlessness when he eats or grooms himself.

- how to operate a microscope.	- list the parts of a microscope. Draw and label a microscope. Operate a microscope using high and l power adjustments.
- a variety of conditions that support microorganisms.	- collect and observe pond water. Draw and label pr under the microscope. Make cultures from material fingernails.
- micro organisms that are helpful to man.	- make penicillin from orange peels in a closed cont
- the basic structure of all living things (the cell).	- make a cover slide of onion skin and stain with co Make a blood smear and identify red and white bloo
- locomotion as a result of muscle extension and retraction in coordination with the skeleton.	- dissect the thigh or wing bone of a chicken: identify muscle fibers identify the bone marrow identify tendons and ligaments. list 20 to 25 major bones of the body. Dissect a identify the vertebrae. List 12 muscles of the bo
- how the body obtains energy for life.	- list the 4 basic food types. Determine the calori content of food by burning each food type. Obser condition of mice fed a variety of food. Define and metabolism.
- behavior is the result of and modified by training.	- list conditional responses observed in students. conditional responses.
- behavior is the result of learned responses.	- list observations of mouse in a maze before and a food is used as reinforcement.
- life is a series of competition of species.	- list the species types found within a marked area school ground.
- the sources of water for plant growth.	- observe and record water penetration in dirt, san humus. Define porosity and relate it to plant gr
- how continuous yeild of forest products is managed.	- construct germination sets. Estimate ages of tre cross sections. Define reforestation conservatio

cope.	- list the parts of a microscope. Draw and label a compound microscope. Operate a microscope using high and low power adjustments.
that support	- collect and observe pond water. Draw and label protococcus under the microscope. Make cultures from material under fingernails.
helpful to man.	- make penicillin from orange peels in a closed container.
ll living things	- make a cover slide of onion skin and stain with codine. Make a blood smear and identify red and white blood cells.
f muscle extension and on with the skeleton.	- dissect the thigh or wing bone of a chicken: identify muscle fibers identify the bone marrow identify tendons and ligaments. list 20 to 25 major bones of the body. Dissect a fish and identify the vertebrae. List 12 muscles of the body
rgy for life.	- list the 4 basic food types. Determine the calorie content of food by burning each food type. Observe the condition of mice fed a variety of food. Define oxidation and metabolism.
f and modified by	- list conditional responses observed in students. Define conditional responses.
f learned responses.	- list observations of mouse in a maze before and after food is used as reinforcement.
etition of species.	- list the species types found within a marked area of school ground.
plant growth.	- observe and record water penetration in dirt, sand and humus. Define porosity and relate it to plant growth.
forest products is	- construct germination sets. Estimate ages of trees by cross sections. Define reforestation conservation.

- the conservation of ecological balance in state and national forests.	- list ten people that have contributed to wildlife tion and their policies. List five dams or gover projects that have bettered living conditions for Write about his experience with conservation of e
- the misconservation of life in the United States.	-make a chart of animals in New York State includi size, habitat and food requirements. Define herb carnivorous, omnivorous.

Biology

- the basic characteristics of life common to all living things.	- differentiate between food producers and consumer Explain how adaptations enable living things to s in their environments. Explain the difference be photosynthetic plants and saprophytic plants. Ex how the sun can be the source of energy for produ sumers, predators, and decomposers. Give an exam a food chain and explain what happens to the mate the energy used by a community. Define homeostas Explain the functions of the egg and sperm in the productive process. Define ecology as the study relationship between organisms and their environm
- the development and use of the universal system of classification.	- explain why it is necessary that all scientists u common system of naming and classifying organisms suggest what would happen if they did not. Descr system of binomial nomenclature developed by Linn List the classification categories in order from to specific. Explain why some scientists use a t kingdom system of classification.
- the factors which affect the growth of populations.	- describe the predator-prey interaction cycle and effect on the population size of each group. Com and contrast a parasite and a host organism. Com contrast competition.
- abiotic and biotic factors which affect an ecosystem.	- define ecological system or exosystem. Explain h materials in an ecosystem are recycled and how th acts as a constant source of energy for the syste

cological balance in
rests.

- list ten people that have contributed to wildlife conservation and their policies. List five dams or government projects that have bettered living conditions for man. Write about his experience with conservation of energy.

f life in the United States.

- make a chart of animals in New York State including their size, habitat and food requirements. Define herbivorous, carnivorous, omnivorous.

Biology

Grade 10

ics of life common to

- differentiate between food producers and consumers. Explain how adaptations enable living things to survive in their environments. Explain the difference between photosynthetic plants and saprophytic plants. Explain how the sun can be the source of energy for producers, consumers, predators, and decomposers. Give an example of a food chain and explain what happens to the materials and the energy used by a community. Define homeostasis. Explain the functions of the egg and sperm in the reproductive process. Define ecology as the study of the relationship between organisms and their environments.

of the universal
n.

- explain why it is necessary that all scientists use a common system of naming and classifying organisms and suggest what would happen if they did not. Describe the system of binomial nomenclature developed by Linnaeus. List the classification categories in order from general to specific. Explain why some scientists use a three kingdom system of classification.

the growth of

- describe the predator-prey interaction cycle and its effect on the population size of each group. Compare and contrast a parasite and a host organism. Compare and contrast competition.

rs which affect an

- define ecological system or exosystem. Explain how most materials in an ecosystem are recycled and how the sun acts as a constant source of energy for the system.

	Compare and contrast herbivores, carnivores and om compare and contrast first-order, second-order and order consumers. Compare and contrast food chains food webs. Compare and contrast the pyramid of en the pyramid of numbers, and the pyramid of biomass ecosystem. Compare and contrast decomposer and sc Compare and contrast commenselism, mutualism, and sitism and list examples of each. Indicate how ab factors influence ecosystems.

Physical Science

Grade 1

- the conditions of soil that are conductive to plant growth.	- be able to operate a soil kit. Use a Ph meter to tie soil conditions. Obtain soil samples and be a analyze them for proper nutrients. Correct soil deficiencies and plot a graph to show how these re plant growth.
- that pollutants may be natural or manmade.	- list the natural pollutants such as pollen, silt, and microbes. List the man-m ade pollutants such sewage, pesticides, industrial wastes, etc. Learn the factors which contribute to the increased cont of the environment.
- that man can no longer depend upon natural processes for pollution controll.	- discuss the role of the individual and of local, s and federal governments in controlling pollution. to public health offices either in person or via t Test the pH of rainwater. Test the pH of ground w Compare the number of drops of standard soap solu needed to produce suds in samples of water.
- that bacterial action causes the decomposition of organic matter.	- set-up a simple experiment to show how bacteria ma organic matter for food and decompose it into simp substances. Determine the (DO) dissolved oxygen i sample by a process called tetration. Illustrate amerobic decomposition forms a dark, putrid smelli in an aquarium in which a large amount of decaying is present.

Compare and contrast herbivores, carnivores and omnivores. Compare and contrast first-order, second-order and third-order consumers. Compare and contrast food chains and food webs. Compare and contrast the pyramid of energy the pyramid of numbers, and the pyramid of biomass in an ecosystem. Compare and contrast decomposer and scavengers. Compare and contrast commenselism, mutualism, and parasitism and list examples of each. Indicate how abiotic factors influence ecosystems.

Physical Science

Grade 10-11

that are conductive - be able to operate a soil kit. Use a Ph meter to measure the soil conditions. Obtain soil samples and be able to analyze them for proper nutrients. Correct soil deficiencies and plot a graph to show how these relate to plant growth.

natural or manmade. - list the natural pollutants such as pollen, silt, dust and microbes. List the man-made pollutants such as sewage, pesticides, industrial wastes, etc. Learn about the factors which contribute to the increased contamination of the environment.

depend upon natural controll. - discuss the role of the individual and of local, state and federal governments in controlling pollution. Talk to public health offices either in person or via tape. Test the pH of rainwater. Test the pH of ground water. Compare the number of drops of standard soap solution needed to produce suds in samples of water.

auses the decomposition - set-up a simple experiment to show how bacteria may use organic matter for food and decompose it into simple substances. Determine the (DO) dissolved oxygen in a sample by a process called tetration. Illustrate how amerobic decomposition forms a dark, putrid smelling sludge in an aquarium in which a large amount of decaying matter is present.

- that biochemical oxygen demand (BOD) refers to the quantity of dissolved oxygen utilized in the biochemical oxidation of organic matter in a specified time at a specified temperature.	- set up a (BOD) test. List a number of diseases parasites bacteria. Evaporate and ignite resid from silty water to show that silt is mostly in matter. Show how chemicals may accelerate the of some organisms and upset the balance of natu

Biological Science

Gr

- a community is an organized groups of population living in mutual dependence.	- make an exological survey of a specific area. may be seen in action if enough interacting org present).
- all living things compete with other living things for the available energy in a food web.	- observe and record how bacterial decomposition subjected to antibiotic action.
- a succession of organisms can be observed in a community until a climax is established.	- observe a community over a 3 week period in a s envirormental system hoping a climax community
- destructive influences can upset a climax community.	- test various H_2O samples for the absence of O_2 indicator of pollution.

A.P. Biology

Gr

- the biotic and abiotic factors which affect an ecosystem.	- define ecological system or ecosystem. Explain energy flows through an ecosystem. Compare and food chains and food webs. Compare and contra pyramid of energy the pyramid of numbers, and t of biomass in an ecosystem. Describe the bioge cycles; Hyirologic, gaseous (nitrogen and carb sedimentary (Phosphorus, and sulfur) and explai step of the cycle. Explain the structure and of ecological communities, including aquatic & List and describe the major biomes. Indicate factors influence ecosystems. Indicate how bi influence ecosystems. Compare & contract Alle Bergmann's rule and Liebig's Law.
- how ecological successions occur and distri-	- define ecological succession. Compare and con

demand (BOD) refers to ed oxygen utilized in on of organic matter a specified temperature.	- set up a (BOD) test. List a number of diseases caused by parasites bacteria. Evaporate and ignite residue taken from silty water to show that silt is mostly inorganic matter. Show how chemicals may accelerate the growth of some organisms and upset the balance of nature.

Biological Science

Grade 10-12

ized groups of popu- dependence.	- make an exological survey of a specific area. (a community may be seen in action if enough interacting organisms are present).
e with other living energy in a food web.	- observe and record how bacterial decomposition are subjected to antibiotic action.
s can be observed in a is established.	- observe a community over a 3 week period in a sealed environmental system hoping a climax community will result. .
an upset a climax	- test various H_2O samples for the absence of O_2 as an indicator of pollution.

A.P. Biology

Grade 12

factors which affect	- define ecological system or ecosystem. Explain how energy flows through an ecosystem. Compare and contrast food chains and food webs. Compare and contrast the pyramid of energy the pyramid of numbers, and the pyramid of biomass in an ecosystem. Describe the biogeochemical cycles; Hydrologic, gaseous (nitrogen and carbon), sedimentary (Phosphorus, and sulfur) and explain each step of the cycle. Explain the structure and diversity of ecological communities, including aquatic & terrestrial. List and describe the major biomes. Indicate how abiotic factors influence ecosystems. Indicate how biotic factors influence ecosystems. Compare & contract Allen's rule, Bergmann's rule and Liebig's Law.
ns occur and distri-	- define ecological succession. Compare and contrast the

bution and the characteristics and distribution of major biomes.	pioneering stage with the climax community and the intermediate stages between the two extrem convergence & list factors which could cause a succession. List the factors which determine of an area and the resulting organisms found t Explain the influence of light as a limiting f life in the oceans. Compare & contrast plankt & those organisms that are called banthos. Co contrast the littoral zone, the neriticzone an abyssal zone.
- man's place in the biosphere and how his influence on the environment can affect the destiny of man and other organisms	- describe air and water pollution resulting fro agricultural and industrial practices. Compar contract biological control of insects & insec controls. List five common pollutants and exp they affect the environment. Identify sources of pollution in the local com suggest changes which could result in the decr pollution.
- the structure, function and development of higher plants.	- compare and contrast the structure and functio gymnosperms and angiosperms. Differentiate between vascular plants and nonv plants. Describe the adaptations which have helped ang become the most abundant form of plant life. Compare & contrast the characteriztics of mono and dicotyledons. Compare and contrast the internal structure of monocot and herbaccous dicot stems. Diagram the cross section view of a woody stem the various structures, and indicate the funct structure. Diagram the external structure of a woody stem the various structures & indicate the function structure. Compare & contrast the structure & functions o and stems. Diagram the external view of a leaf, identify structures & indicate the functions of these st

teristics and distribution	pioneering stage with the climax community and describe the intermediate stages between the two extremes. Define convergence & list factors which could cause secondary succession. List the factors which determine the biome of an area and the resulting organisms found therein. Explain the influence of light as a limiting factor for life in the oceans. Compare & contrast plankton, nekton, & those organisms that are called banthos. Compare & contrast the littoral zone, the neriticzone and the abyssal zone.
osphere and how his ronment can affect the ner organisms	- describe air and water pollution resulting from current agricultural and industrial practices. Compare & contract biological control of insects & insecticide controls. List five common pollutants and explain how they affect the environment. Identify sources of pollution in the local community and suggest changes which could result in the decreased pollution.
n and development of	- compare and contrast the structure and function of gymnosperms and angiosperms. Differentiate between vascular plants and nonvascular plants. Describe the adaptations which have helped angiosperms become the most abundant form of plant life. Compare & contrast the characteriztics of monocotyledons and dicotyledons. Compare and contrast the internal structure of herbaceous monocot and herbaccous dicot stems. Diagram the cross section view of a woody stem, identify the various structures, and indicate the function of each structure. Diagram the external structure of a woody stem, identify the various structures & indicate the function of each structure. Compare & contrast the structure & functions of roots and stems. Diagram the external view of a leaf, identify the various structures & indicate the functions of these structures.

	Describe the process whereby water travels from by successive osmosis to xylem in plants. Describe the cohesion-tension theory & explain phenomenon is beneficial to complex plants. Describe the process of translocation & indica plant structures involved in this process.
- some of the patterns of reproduction found in higher plants.	- describe the life cycle of angiosperms. Diagram a flower, identify the various parts a the function of each part. Compare & contrast the water requirements of m ferns with those of the angiosperms. Describe the adaptations which have helped flo plants dominate the earth. Compare & contrast self-pollination & cross-pol Differentiate between testes and ovaries in an and plants.
- the stages of embrology in higher plants and the changes through which an organism attains final form.	- define embryology as the study or development Diagram a typical angiosperm seed, identify the structures, and indicate the function of each Describe the developmental process as it occur plants.
- how some of the many functions of higher plants are controlled by chemical control systems.	- describe the role of anxin IAA in causing posit phototropism. List and describe other effects of anxins. Describe the use of gibberellic acid and its i to agriculture. Describe the formation of abscission tissue.
- some of the patterns of reproduction and development found in animals.	- define asexual reproduction & indicate that it accomplished by mitosis. Describe the process of asexual reproduction by & cite two examples. Compare & contrast fission in asexual reproduct fusion in sexual reproduction. Differentiate between testes & ovaries in anima Compare & contrast external fertilization and i fertilization.

	Describe the process whereby water travels from root hairs by successive osmosis to xylem in plants. Describe the cohesion-tension theory & explain how this phenomenon is beneficial to complex plants. Describe the process of translocation & indicate the plant structures involved in this process.
f reproduction found in	- describe the life cycle of angiosperms. Diagram a flower, identify the various parts and describe the function of each part. Compare & contrast the water requirements of masses and ferns with those of the angiosperms. Describe the adaptations which have helped flowering plants dominate the earth. Compare & contrast self-pollination & cross-pollination. Differentiate between testes and ovaries in animals and plants.
y in higher plants and ich an organism attains	- define embryology as the study or development of organisms. Diagram a typical angiosperm seed, identify the various structures, and indicate the function of each structure. Describe the developmental process as it occurs in seed plants.
unctions of higher plants ical control systems.	- describe the role of anxin IAA in causing positive phototropism. List and describe other effects of anxins. Describe the use of gibberellic acid and its importance to agriculture. Describe the formation of abscission tissue.
of reproduction and animals.	- define asexual reproduction & indicate that it is accomplished by mitosis. Describe the process of asexual reproduction by fission & cite two examples. Compare & contrast fission in asexual reproduction and fusion in sexual reproduction. Differentiate between testes & ovaries in animals. Compare & contrast external fertilization and internal fertilization.

	Describe the fertilization process as it occurs Describe the human menstrual cycle & explain ho control this cycle. Describe the different kinds of gamete formatio Differentiate between cleavage & gastrulation. Describe the germ layer origins of organ systems Discuss the problems of differentiation, nucleo plantation, induction, antimetabolities, centri to the tools of analysis. Describe the formation and state the function o extraembryonic membranes of a reptile or bird. State the functions of the placenta and umbilic Describe the pattern of circulation in a mammal embryo and the changes occuring at birth.
- structure and function in animal system with major emphasis on vertebrates.	- define digestion as the process by which orgais complex molecules into simpler once. Label a diagram of the digestive system of man. List the enzymes which function in the digestiv state the site of activity and the types of foo enzymes affect along with the products of the r Describe the absorption process & the various s & systems involved in this process as it occurs small intestine. Define respiration and differenciate between in and external respiration and their relationship respiration. Describe the lung system found in land animals with the respiratory system found in arthropods Diagram the respiratory system in humans, ident each of the structures, and indicate the functi structure. Describe the respiratory system in complex aqua & explain the function of the gills. Define excretion and explain why organisms must selves of nitrogenous wastes. Describe the processes used by fresh water anim maintaining proper water balance and removing w material. Diagram the human kidney nephron, identify its

Describe the fertilization process as it occurs in humans.
Describe the human menstrual cycle & explain how hormones control this cycle.
Describe the different kinds of gamete formation.
Differentiate between cleavage & gastrulation.
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Discuss the problems of differentiation, nuclear transplantation, induction, antimetabolities, centrifugation to the tools of analysis.
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- define digestion as the process by which orgaisms break complex molecules into simpler once.
Label a diagram of the digestive system of man.
List the enzymes which function in the digestive system, state the site of activity and the types of food the enzymes affect along with the products of the reactions.
Describe the absorption process & the various structures & systems involved in this process as it occurs in the small intestine.
Define respiration and differenciate between internal and external respiration and their relationship to cellular respiration.
Describe the lung system found in land animals and compare with the respiratory system found in arthropods.
Diagram the respiratory system in humans, identify each of the structures, and indicate the function of each structure.
Describe the respiratory system in complex aquatic animals & explain the function of the gills.
Define excretion and explain why organisms must rid themselves of nitrogenous wastes.
Describe the processes used by fresh water animals in maintaining proper water balance and removing waste material.
Diagram the human kidney nephron, identify its various

structures and describe the function of each structure.
Describe the function of the hormone vasopressin in the homeostatic mechanism of water balance.
Describe the function of the liver, as an excretory organ, including its role in urea formation.
Describe the transpor system as a link between the cells of the organism and its environment.
Compare & contrast the patterns of circulation in an amphibian and in a male, renal and hepaticportal systems.
Diagram the human circulatory system, list various structures involved, indicate the function of each structure, and trace the flow of blood through the system.
Describe the composition & functions of blood & lymph.
Discuss the homeostatic control of blood composition.
Label a diagram of the basic structural plan of the skeleton.
Describe the relation of muscles to skeletal movements, ligaments, tendons, antaganistic action of muscles & muscle physiology.
Compare & contrast the structure & function of the three kinds of muscle found in vertebrates: Strated, smooth & cardiac.
Discuss the endocrine glands as to: methods of investigation, anatomy, function and relationships with each other & with the nervous system.
List the 5 major divisions of the brain and state the functions of the parts of the brain and spinal cord.
Compare & contrast cranial & spinal nerves.
List the types of neurons & diagram the structure of each.
Describe the nature of the nerve impulse. Define synaptic transmission, reflex arc, antigravity reflex.
List the structure, function & neurohumors of sympathetic & para sympathetic division of the autonomic nervous system.
State the relationship of the sympathetic division to the adrenal medualla.